

**SPC Day 2 Convective Outlook**  
Product Description Document (PDD)  
11/14/2019

**Part I - Mission Connection**

- a. Product Description – The Storm Prediction Center’s (SPC) Day 2 Convective Outlook is a one-day forecast of the potential for severe convective weather across the continental United States (CONUS). The Day 2 Convective Outlook previously included a probabilistic forecast for severe convection as well as areas of defined risk categories derived from the probabilistic information. The risk categories include general non-severe thunderstorms and 5 tiers of risk categories (Marginal, Slight, Enhanced, Moderate, and High) which are mirrored in both the Day 1 and Day 3 Convective Outlooks. The Day 2 Convective Outlook will now provide probabilistic graphics for the individual convective threats (tornado, damaging thunderstorm winds, large hail), similar to the Day 1 Convective Outlook.
- b. Product Type – Operational
- c. Purpose – The SPC issues Day 2 Convective Outlooks to provide meteorological threat-based information on convective hazards. The categorical outlook graphic displays forecasts of severe convective threats in the form of categories, outlined in the Product Description section. The probabilistic outlooks consist of individual hazards for tornadoes, hail, and wind, which allows the audience to discern the potential coverage of each of these separate convective threats.
- d. Audience – The target audience includes NWS CONUS Weather Forecast Offices (WFOs), the public, media, and emergency managers. The product has been widely used to adequately prepare days in advance for the potential of severe convective weather.
- e. Presentation Format – The SPC Day 2 Convective Outlook is available as web graphics with alphanumeric text-based discussion, Redbook Graphics, Points products, and National Digital Forecast Database (NDFD) grids.

**Part II - Technical Description**

- a. Format and Science Basis – The SPC is maintaining the Day 2 categorical severe weather outlook with three individual probabilistic hazard forecasts (tornado, damaging wind, hail) replacing the “total severe” probabilistic forecast. In recent years improvements in high spatial and temporal resolution numerical guidance, the aim for efforts in research to enhance operations, and human evaluation and validation of supporting numerical guidance in a testing environment have allowed the addition of the probabilistic forecasts for these individual convective threats in the Day 2 time frame. These forecast additions will support more precise and effective communication of risk

by describing the likelihood of individual severe weather threats an entire day ahead of time, previously only available in the Day 1 Outlook for a number of years. Changes to the format of the product output will also improve the use of these outlook forecasts for end users who incorporate them into GIS systems.

In April 2018, SPC introduced an intermediary step to the addition of the three individual threat risk graphics with the inclusion of a “Maximum Risk by Hazard” table at the end of the Day 2 Convective Outlook alphanumeric/text discussion. This text-based table displayed the highest forecast probabilities for each of the specific convective hazards (tornado, wind, and hail) with no accompanying graphics. The maximum value of the three hazards was understood to be the primary reflection of the total severe risk categories (e.g. Marginal, Slight, Enhanced, Moderate, etc.) for the outlook period in the Categorical graphic. The table also included whether an area of “significant severe” was associated with that particular hazard, denoted by the abbreviation, “SIG”.

Here is the example of a “Maximum Risk by Hazard” table for the Day 2 Convective Outlook (issued on April 2, 2017):

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...MAXIMUM RISK BY HAZARD...
Tornado: 10% SIG - Enhanced
Wind:    45% SIG - Moderate
Hail:    5%    - Marginal
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With the addition of the three individual risk graphics for the convective hazards, tornado, wind, and hail, the “Maximum Risk by Hazard” table will be discontinued from the text discussion section of the Day 2 Convective Outlook product.

The risk categories defined below where percentages are numerical probabilities of severe weather within 25 statute miles of any point within a given forecast area allow the SPC to transition the Day 2 Convective Outlook to issue individual probability forecast graphics, emphasizing which threat(s) drives the overall forecast category(ies).

## **Day 2 Risk Categories and Associated Probabilities:**

### **General Thunderstorms**

- 10% or greater probability of non-severe or sub-severe thunderstorms.

### **Severe Category 1 - Marginal**

- 2% tornado probability, or
- 5% severe hail or severe wind probability.

### **Severe Category 2 - Slight**

- 5% tornado probability, or
- 15% severe hail or severe wind probability with or without 10% or greater

probability of hail 2 inches or greater in diameter, or wind gusts 75 mph or greater.

Severe Category 3 - Enhanced

- 10% tornado probability with or without 10% or greater probability of a tornado that produces EF2 or greater damage, or
- 15% tornado probability, or
- 30% severe hail or severe wind probability with or without 10% or greater probability of hail 2 inches or greater in diameter, or wind gusts 75 mph or greater, or
- 45% probability of severe hail or wind.

Severe Category 4 - Moderate

- 15% tornado probability and 10% or greater probability of a tornado that produces EF2 or greater damage, or
- 30% tornado probability, or
- 45% severe wind probability and 10% or greater probability of a wind gusts 75 mph or greater, or
- 45% severe hail probability and 10% or greater probability of hail 2 inches or greater in diameter, or
- 60% severe wind probability, or
- 60% severe hail probability with or without 10% or greater probability of hail 2 inches or greater in diameter.

Severe Category 5 - High

- 30% tornado probability and 10% or greater probability of a tornado that produces EF2 or greater damage, or
- 45% or greater tornado probability with or without 10% or greater probability of a tornado that produces EF2 or greater damage, or
- 60% severe wind probability and a 10% or greater probability of a wind gusts 75 mph or greater.

b. Availability – No changes to the issuance times of these products.

Day 2 Outlook Probability	TORN	WIND	HAIL
2%	MRGL	Not Used	Not Used
5%	SLGT	MRGL	MRGL
10%	ENH	Not Used	Not Used
10% with Significant Severe	ENH	Not Used	Not Used
15%	ENH	SLGT	SLGT
15% with Significant Severe	MDT	SLGT	SLGT
30%	MDT	ENH	ENH
30% with Significant Severe	HIGH	ENH	ENH
45%	HIGH	ENH	ENH
45% with Significant Severe	HIGH	MDT	MDT
60%	HIGH	MDT	MDT
60% with Significant Severe	HIGH	HIGH	MDT

Day 2 Outlook Probability to Category Conversion Table

The following products reflect these changes:

WMO Header	AWIPS ID	Description
ACUS02 KWNS	SWODY2	Day 2 Convective Outlook Discussion
WUUS02 KWNS	PTSDY2	Day 2 Convective Outlook Areal Outline
PGWI47 KWNS	RBG98O	Day 2 Red Book Graphic Categorical Outlook
LDIZ27 KWNS		Day 2 NDFD Categorical Outlook
LDIZ21 KWNS		Day 2 NDFD Probability of Tornadoes
LDIZ22 KWNS		Day 2 NDFD Probability of Hail
LDIZ23 KWNS		Day 2 NDFD Probability of Wind
LDIZ24 KWNS		Day 2 NDFD Probability of Significant Tornadoes
LDIZ25 KWNS		Day 2 NDFD Probability of Significant Hail
LDIZ26 KWNS		Day 2 NDFD Probability of Significant Wind
PGNE02 KWNS	GPHOT2	Redbook Graphic Tornado Probabilities
PENE02 KWNS	GPHOH2	Redbook Graphic Hail Probabilities
PWNE02 KWNS	GPHOW2	Redbook Graphic Wind Probabilities

**Examples of the graphical output from the Day 2 Convective Outlook:**

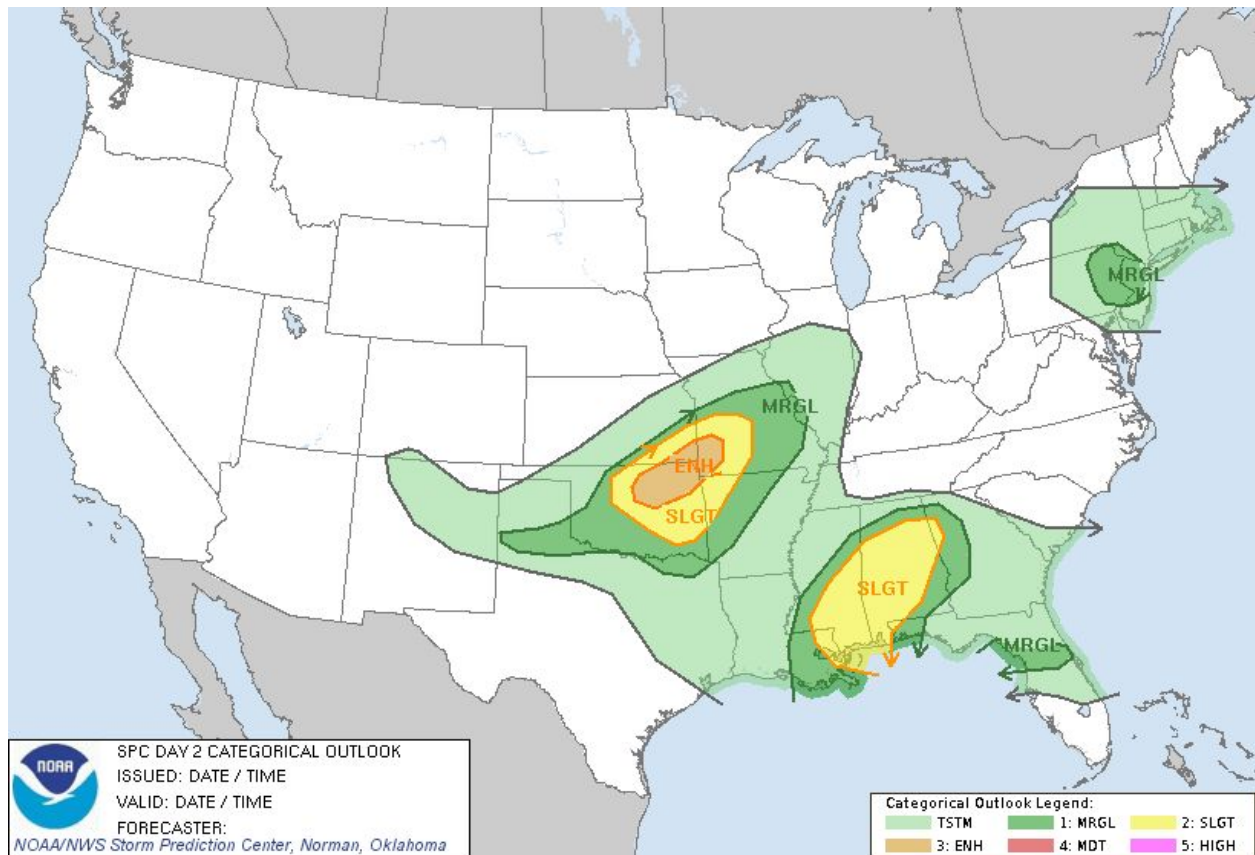


Figure 1: Example Categorical Outlook graphic for the Day 2 Convective Outlook.

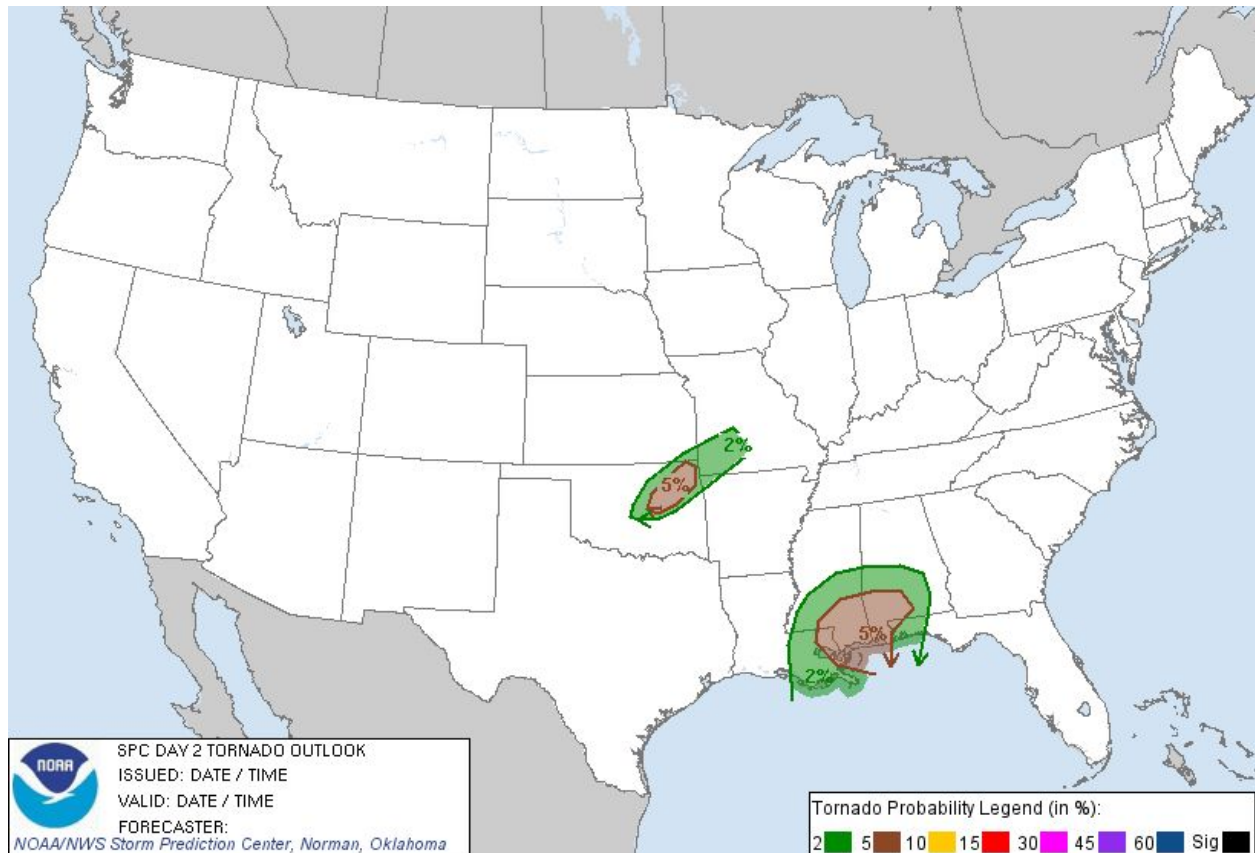


Figure 2: Example Tornado Outlook graphic for the Day 2 Convective Outlook, displaying the probability of a tornado within 25 miles of a point. A hatched area (not shown) would indicate a 10% or greater probability of EF2 - EF5 tornadoes within 25 miles of a point.

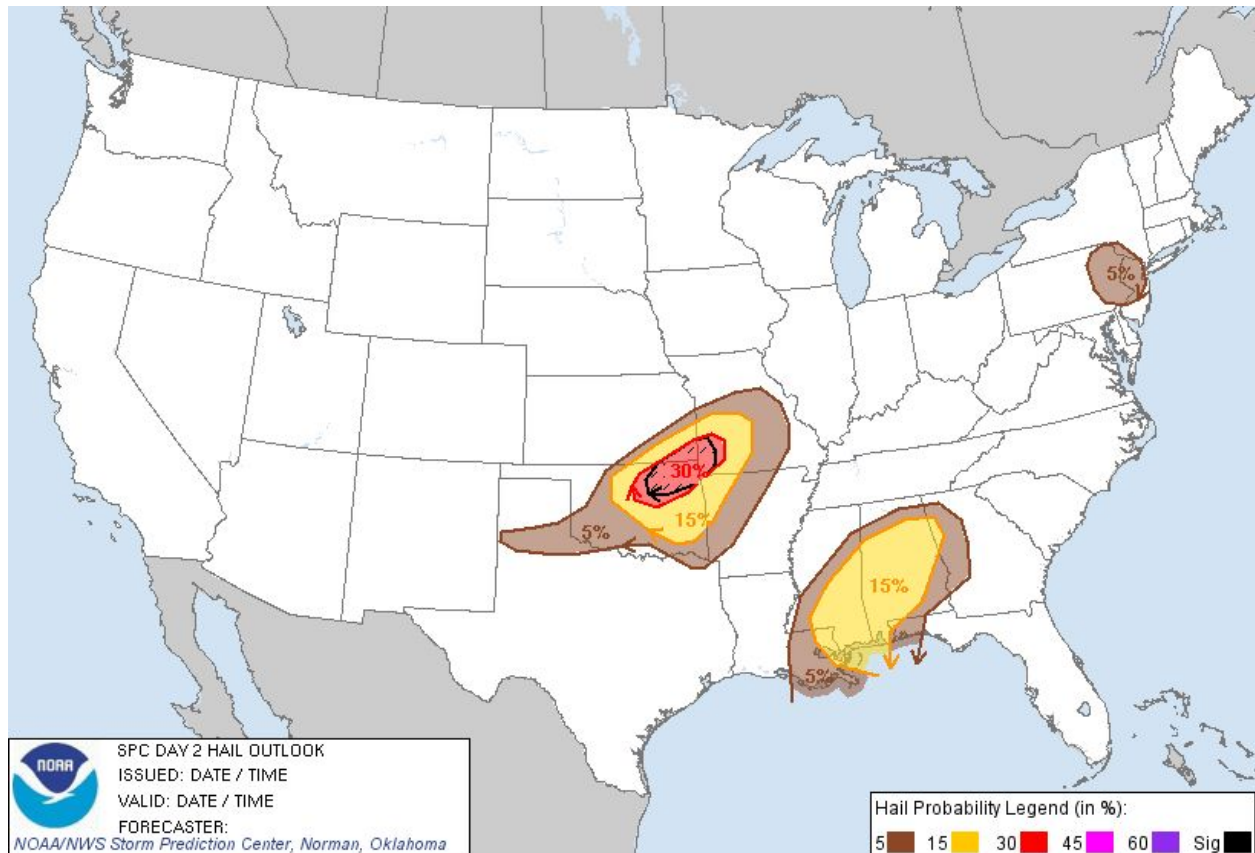


Figure 3: Example Hail Outlook graphic for the Day 2 Convective Outlook, displaying the probability of one inch diameter hail or larger within 25 miles of a point. The hatched area (shown with closed area denoted by the black line and arrow over the 3 corners region of KS, OK, and MO) indicates a 10% or greater probability of two inch diameter hail or larger within 25 miles of a point.



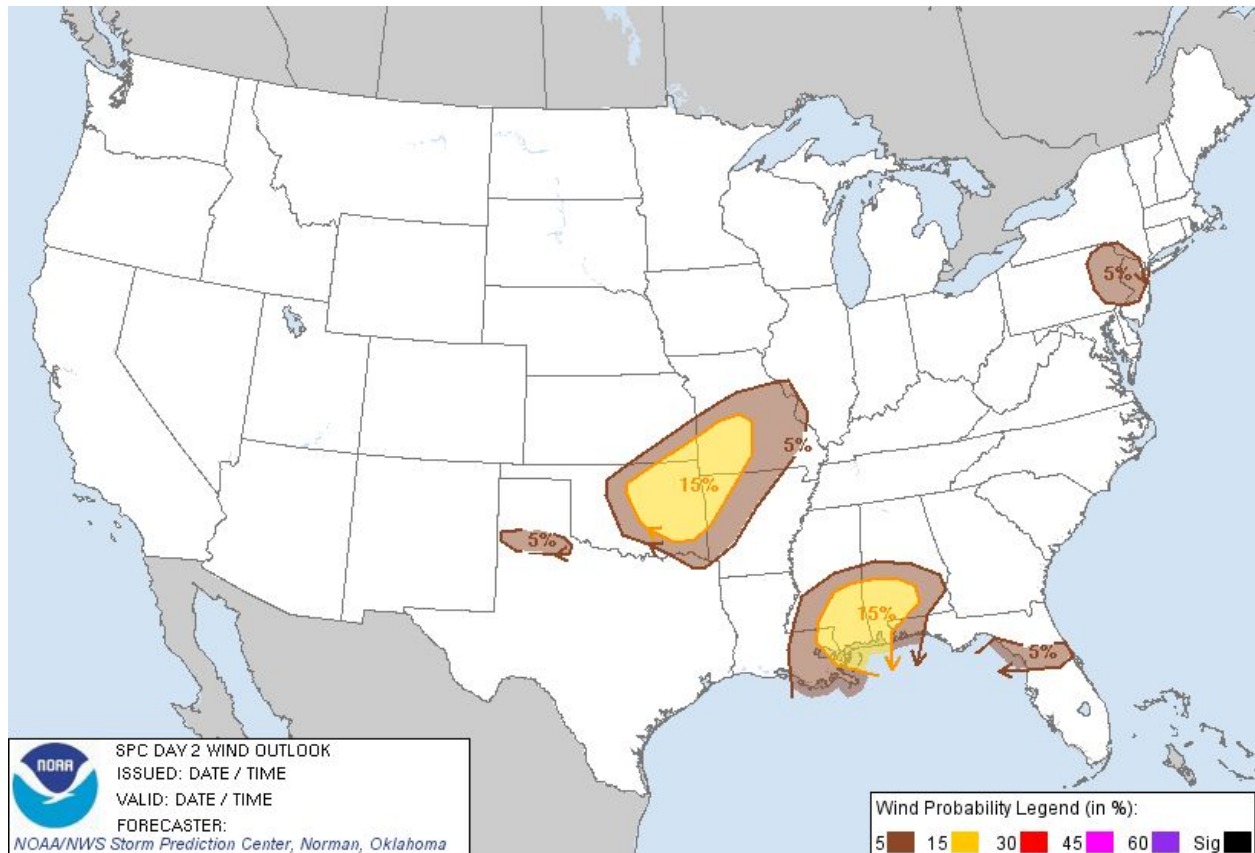


Figure 4: Example Wind Outlook graphic for the Day 2 Convective Outlook, displaying the probability of damaging thunderstorm winds or wind gusts of 50 knots or higher within 25 miles of a point. A hatched area (not shown) would indicate a 10% or greater probability of wind gusts 65 knots or greater within 25 miles of a point.